Digital remote display for Flow Meter DM / DE

Productive metering instrument PR
Indication of the actual flow rate in m³/h

Merkmale
- LED-Display 14,2mm red
- Display range ±99999 digit
- 0 ... 3 decimal points programmable
- 2 digital inputs for summation, difference, ratio and product measurement
- Hold-input
- Integrated transmitter-supply 24 / 8V DC
- Max. 4 outputs, SPDT relay or transistor
- Display conversion programmable
- Isolated analog output,
  0/4 ... 20mA and 0/2 ... 10V DC
- Front protection IP65

General
The Productivity Panelmeter PR9648 analyses impulse rates, representing a speed, flow, passing time or revolutions per time. The displayed values therefore always refer to a determined time unit and represent productivity. There are extensive functions programmable (see page 6). Since impulses and unit of a displayed value can take any relation, the device offers extensive conversion possibilities.

Short information
Programming Parameters are programmed via front-side membrane keypad
Transmitter-supply The integrated transmitter supply allows direct connection of pnp initiators, light barriers, mechanical switch contacts, proximity switches, rotary encoder (24V DC) and Namur initiators (8V DC).
Input prescaler An input prescaler has separate programming function for input A and B.
Display conversion A separate programmable divisor and factor makes the display adaptable as required.
Alarm outputs Switching performance of the alarm outputs is programmable as minimum or maximum function.
Analog output Proportional to the display value an isolated analog output signal 0 ... 20mA / 0 ... 10V DC or 4 ... 20mA / 2 ... 10V DC can be generated. Start value and end value are programmable. Output changed automatically from current signal to voltage signal, depending on burden.
Hold-function Display freezes by control input level 24V DC or voltage free contact (see page 3).
Technical Data

Power supply
Supply voltage: 230V AC ±10%; 115V AC ±10%; 24V AC ±10% or 24V DC ±15%
Power consumption: max. 3.5VA, with analog output 5VA
Operating temperature: -10 ... +55°C
Rated voltage: 250V – acc. to VDE 0110 between input / output / supply voltage
Degree of pollution 2, over-voltage category III
Test voltage: 4kV–, between input / output / supply voltage
CE - conformity: EN55022, EN60555, IEC1000-4-3/4/5/11/13

Input
pnp input: Ri = 6.3kΩ level; < 4V low; > 8.5V high;
Hysteresis > 2.5V, max. 35V DC
Namur input: Ri appr. 1kΩ (<4mA) level; < 1mA low; >2.2mA high;
Hysteresis > 0.5mA max. 35V DC
Impulse frequency: Input A or B = 0.1Hz ... 15kHz, A and B together = 0.1Hz ... 8kHz,
switch contact = 0.1Hz ... 30Hz, 2-channel rotary encoder = 0.1Hz ... 10kHz;
Min. Impulse width: Electronic impulse 50μs, switch contact 5ms
Time base: Seconds, minutes or hours
Accuracy: ≤ 0.003% ±1 Digit
Transmitter supply: 8V DC (Namur), 24V DC (pnp), Ri appr. 1500,
max. 50mA (max. 25mA with 4 relay outputs)

Display: LED red, 14.2mm
Display range: -99999 ... 99999 digit with leading zero suppression
Parameter display: LED 2-digit red, 7mm (parameter - and output indicator)

Output
Relay: SPDT <250V AC<250VA<2A, <300V DC<50W<2A
Transistor: max. 35V AC/DC / 100mA, with short circuit protection
Analog output: 0/4 ... 20mA burden ≤500Ω; 0/2 ... 10V burden >500Ω, isolated
Automatic output changing (burden dependent)
Accuracy: 0.1%; TK 0.01%/K

Panel case: DIN96x48mm Material PA6-GF; UL94V-0
Dimensions: Front 96x48mm, mounting depth 100mm,
Weight: max. 390g
Electrical connection: Clamp terminals, 2mm² single wire, 1mm² flexible wire, AWG14
Protection: Front IP65, terminals IP20, finger safe acc. BGV A2 (old VBG4)

Dimensions

- 2 -

01.06
Connection diagrams

Terminal strip A
2-channel rotary encoder (ext. supply)

Terminal strip B
2 preselect (alarm) outputs
Relay

Terminal strip C
Analog output
AO

Terminal strip D supply voltage

230V
~

24V DC
~

2-channel rotary encoder
pnp-Initiator, rotary encoder (24V DC)
Namur-initiator (8V DC)
Switch-contact

Input A
2
Input B
3
Gnd
4
Hold
Transmitter supply
+24V/8V max. 50mA
Controls and indicators

Description
Operation of the device is arranged in 2 levels. The requested parameter can be called by button. Selection within a parameter or entering data, use buttons and . Parameters are stored zero-voltage safe in the EEPROM.

Button combinations:
- + one parameter back.
- + setting parameter to zero or minimum value.

After turn on the supply voltage, the device is working in the Working level. Set points of preselect (alarm) outputs can be selected.

Activating the button for more than 2 seconds, the program is jumping into the Configuration level. Now all parameters, defining the function of the device can be programmed. These maybe the measuring input, input configuration, conversion of the displayed value, switching performance of alarm outputs and the analog output signal.

After finishing the configuration or when longer than 2 minutes no button was pushed, the program jumps back to the working level. Leaving the configuration level is possible at any time when pushing the button for 2 seconds.

Error messages:

PE Reading this message in the parameter display, parameter failure has been occurred. The display flashes. When pushing one of the buttons the error code will be deleted and the device is running with factory settings. Configuration and function of the device must be checked. If error occurs again, please ship the device to factory for repair service.

Lc Programming lock active ⇒ see configuration page 9

OF Overflow
**Notes to representation**

- Parameter only shown when configurated
- Parameter is only shown when installed in the device (see order code)

Note: All parameters can be called if they are not blocked by other programmed parameters and if they are available. Factory settings are shown in [ ].

### Working level

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[Factory settings]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="4123" /></td>
<td>Actual value</td>
<td><img src="image" alt="4123" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="8450" /></td>
<td>Output indication (only if installed and activated).</td>
<td><img src="image" alt="8450" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="15" /></td>
<td>Display peak reading Reset with the buttons ↑ or ↓, or at every power off.</td>
<td><img src="image" alt="15" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="2125" /></td>
<td>Display valley reading Reset with buttons ↑ or ↓, or at every power off.</td>
<td><img src="image" alt="2125" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="125" /></td>
<td>Setpoint output A1 Setting possible from -99999 ... 99999 digit with buttons ↑ and ↓.</td>
<td><img src="image" alt="125" /></td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="0" /></td>
<td>Setpoint output A2 Setting possible from -99999 ... 99999 digit with buttons ↑ and ↓.</td>
<td><img src="image" alt="0" /></td>
</tr>
</tbody>
</table>

**Note:** Setpoint of the alarm outputs A1 to A4 are identical.
## Configuration level

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[Factory settings]</th>
</tr>
</thead>
</table>

press 2 sec.

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[R-b]</th>
</tr>
</thead>
</table>

- \( R - b \) = A up, B down
- \( R_{up}, b \) = A up, B up
- \( \theta \) = rotary encoder
- \( b / R \) = ratio or passing time
- \( R - b - b \) = proportional deviation (A-B) / Bx100
- \( b - R - b \) = proportional deviation (B-A) / Bx100

Selection with buttons \( \uparrow \) and \( \downarrow \).

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[Lo]</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Button Image]</td>
<td>![Display Image]</td>
<td>![Lo Image]</td>
<td>Input frequency</td>
</tr>
</tbody>
</table>

- \( \omega_o \) ≤ 30 Hz, for switch contacts
- \( \omega_o \) ≤ 15 kHz, for electronic outputs

Selection with buttons \( \uparrow \) and \( \downarrow \).

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[i]</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Button Image]</td>
<td>![Display Image]</td>
<td>![i Image]</td>
<td>Prescaler input A</td>
</tr>
</tbody>
</table>

Setting possible from / ... 9999 digit with buttons \( \uparrow \) and \( \downarrow \). (only every \( n^{th} \) impulse is counted)

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[i]</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Button Image]</td>
<td>![Display Image]</td>
<td>![i Image]</td>
<td>Prescaler input B</td>
</tr>
</tbody>
</table>

Setting possible from / ... 9999 digit with buttons \( \uparrow \) and \( \downarrow \). (only every \( n^{th} \) impulse is counted)

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[Off]</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Button Image]</td>
<td>![Display Image]</td>
<td>![Off Image]</td>
<td>Constant input B</td>
</tr>
</tbody>
</table>

- \( \text{Off} \) = no function
- \(-9999 \ldots \text{off} \ldots 99999\) Setting possible from \(-9999 \ldots 99999\) digit with buttons \( \uparrow \) and \( \downarrow \). Input B is deactivated. Input signal will be replaced by Constant \( \theta \). This constant enables to measure e.g. the slippage of a motor, the deviation from a reference value or the passing time in a continuous heater.

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[U=24]</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Button Image]</td>
<td>![Display Image]</td>
<td>![U=24 Image]</td>
<td>Transmitter supply / Input level</td>
</tr>
</tbody>
</table>

- \( U = 24 \) = 24V DC for pnp-initiators
- \( U = 8 \) = 8V DC for Namur-initiators

(* with ext. 5V supply also suitable for TTL-signals *)

Only for factory settings

Selection with buttons \( \uparrow \) and \( \downarrow \).
### Productive metering instrument PR

**Time base**

- **SEC**
  - hr = hour (h⁻¹)
  - min = minutes (min⁻¹)
  - sec = seconds (s⁻¹)

Selection with buttons ▲ and ▼.

**Refresh time (displayed time)**

- **[ 1.0]**
  - Setting possible from 0.1 ... 99.9 sec. with buttons ▲ and ▼.
  - Maximum display accuracy will be reached:
    \[ r \leq (\text{max. display time in digit}) \times 0.000024 \text{ s} \]
  - Example: max. display value 1200.0
    \[ r = 12000 \times 0.000024 = 0.288 \text{ s} \]
  - Note: At minimum 2 impulses must run the input within one refresh cycle (refresh time).

**Decimal point position**

- **[ 0.]**
  - Selection with buttons ▲ and ▼.

**Digital filter**

- **[ oFF ]**
  - Selection with buttons ▲ and ▼.

**Divisor for display**

- **[ ]**
  - Setting possible from 1 ... 9999 digit with buttons ▲ and ▼.

**Factor for display**

- **[ ]**
  - Setting possible from 1 ... 9999 digit buttons ▲ and ▼.

**Negative sign**

- **[ oFF ]**
  - Selection with buttons ▲ and ▼.

---

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### Productive metering instrument PR

<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
<th>[Factory settings]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="Image" alt="off" /></td>
<td>Switching performance output A1</td>
<td><img src="Image" alt="off" /></td>
</tr>
<tr>
<td></td>
<td><img src="Image" alt="2125" /></td>
<td>Setpoint output A1</td>
<td><img src="Image" alt="0" /></td>
</tr>
<tr>
<td></td>
<td><img src="Image" alt="125" /></td>
<td>Setpoint output A2</td>
<td><img src="Image" alt="0" /></td>
</tr>
<tr>
<td></td>
<td><img src="Image" alt="hy" /></td>
<td>Common Hysteresis for outputs A1 ... A4.</td>
<td><img src="Image" alt="1" /></td>
</tr>
</tbody>
</table>

- **[off]**
  - = no action
  - (min) = continuous contact: on-off
  - (max) = continuous contact: off-on
  - Selection with buttons [▲] and [▼].

- **[0]**
  - Setting possible from -99999 ... 99999 digit with buttons [▲] and [▼].
  - Decimal points only displayed if a fixed decimal point was programmed.

- **[0]**
  - Setting possible from -99999 ... 99999 digit with buttons [▲] and [▼].
  - Decimal points only shown if a fixed decimal point was programmed.

- **[1]**
  - Setting possible from 1 ... 9999 digit with buttons [▲] and [▼].
  - Decimal points only shown if a fixed decimal point was programmed.
  - Parameter only shown if at minimum 1 output is activated.

**Note:** Switching performance and setpoint of the outputs A1 bis A4 are identical.

Continue page 9
<table>
<thead>
<tr>
<th>Button</th>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
</table>
|        | **0-20** | Analog output  
0 - 20 mA (0 - 10 V DC)  
4 - 20 mA (2 - 10 V DC).  
The changing from current to voltage output is load-dependent  
(≤ 500Ω = current output, > 500Ω = voltage output).  
Selection with buttons ▲ and ▼. |
|        | **0**   | Start value for analog output  
Setting possible from -99999 ... 99999 with buttons ▲ and ▼.  
Decimal point only shown if programmed. |
|        | **2030** | End value for analog output  
Setting possible from -99999 ... 99999 with buttons ▲ and ▼.  
With fixed decimal point programming the difference between start- and end value must be at minimum 4000 digit to get the maximum display resolution.  
With floating point, RS to parameter RS und RE changing automatically for best resolution.  
If the start value RS > end value RE, the output works with decreasing characteristic.  
Decimal points only shown if a fixed decimal point was programmed |
|        | **OFF** | Program lockout  
OFF = no lock  
CONF = configuration level locked  
ALL = all parameters locked  
AO = only with analog output (only for factory settings)  
Selection with buttons ▲ and ▼. |
|        | **4123** | Return to the working level |
### Connection diagram for Flow Meter DM/DE

![Connection diagram for Flow Meter DM/DE](image)

### Example of programming for Flow Meter DM/DE

**Connection at pulser E 200**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Designation / Display</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input configuration</td>
<td>IF</td>
<td>A-b</td>
</tr>
<tr>
<td>Frequency input</td>
<td>IF</td>
<td>High</td>
</tr>
<tr>
<td>Prescaler input A</td>
<td>dA</td>
<td>1</td>
</tr>
<tr>
<td>Prescaler input B</td>
<td>db</td>
<td>1</td>
</tr>
<tr>
<td>Constant input B</td>
<td>Cb</td>
<td>off</td>
</tr>
<tr>
<td>Transmitter supply</td>
<td>In</td>
<td>U = 8</td>
</tr>
<tr>
<td>Time base</td>
<td>tb</td>
<td>hr</td>
</tr>
<tr>
<td>Refresh time</td>
<td>rt</td>
<td>3.0</td>
</tr>
<tr>
<td>Decimal point position</td>
<td>dp</td>
<td>.0</td>
</tr>
<tr>
<td>Digital filter</td>
<td>Fi</td>
<td>off</td>
</tr>
<tr>
<td>Divisor for display</td>
<td>d</td>
<td>5000 / 500 / 250 / 1375 cp-value of the flow meter</td>
</tr>
<tr>
<td>Factor for display</td>
<td>F</td>
<td>1/10</td>
</tr>
<tr>
<td>Negative sign</td>
<td>Si</td>
<td>off</td>
</tr>
<tr>
<td>Switching performance A1</td>
<td>Al</td>
<td></td>
</tr>
<tr>
<td>Setpoint output A1</td>
<td>Al</td>
<td></td>
</tr>
<tr>
<td>Switching performance A2</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>Setpoint A2</td>
<td>A2</td>
<td></td>
</tr>
<tr>
<td>Common hysteresis for output A1,A2</td>
<td>Hy</td>
<td></td>
</tr>
<tr>
<td>Analog output</td>
<td>Ao</td>
<td></td>
</tr>
<tr>
<td>Start value for analog output</td>
<td>AS</td>
<td></td>
</tr>
<tr>
<td>End value for analog output</td>
<td>AE</td>
<td></td>
</tr>
</tbody>
</table>

**Program lockout**

| LC | as required |

We reserve the right to make technical modifications in the interest of progress.